

Unit 1 – Biology

1. Fat, bone and blood are examples of what type of tissue?

- a) epithelial
- b) nervous
- c) muscle
- d) connective**

2. This organ system supports, protects and works with muscles to move parts of the body.

- a) integumentary system
- b) skeletal system**
- c) nervous system
- d) reproductive system

3. Which of the following is not a phase of mitosis?

- a) Prophase
- b) Anaphase
- c) Telophase
- d) Metaphase
- e) Mesophase**

4. Which cell component is responsible for conversion of glucose to a more usable form of energy?

- a) Mitochondria**
- b) Golgi Body
- c) Chloroplast
- d) Vacuole
- e) Ribosome

5. Describe what is a tumour and why may it be later diagnosed as cancer?

uncontrollable growth- if it takes over the other cells, it is cancer

6. Match the organelles below to their definitions.

- | | |
|-----------------------------|--|
| __E__ Nucleus | A. Storage of sugars and proteins |
| __G__ Ribosomes | B. Converts glucose into energy for the cell. |
| __I__ Endoplasmic reticulum | C. Filaments and tubules that provide a framework for the cell |
| __D__ Golgi apparatus | D. Sorts and packages proteins |
| __H__ Chloroplasts | E. Control Centre of the Cell |
| __B__ Mitochondria | F. This is the “goo” that organelles in the cell float around in |
| __F__ Cytoplasm | G. Creates protein |
| __C__ Cytoskeleton | H. Found only in plant cells, these are responsible for photosynthesis |
| __A__ Vacuole | I. Connected to the nucleus, this is where ribosomes hang out |
| __J__ Cell Wall | J. Rigid outer layer of plant cells |

7. Explain the functions of xylem and phloem.

xylem- transports water phloem- transports sugars

8. Animal cells and plants cells have many similarities, and some differences as well. Please list 3 key differences in their structure below.

plant cells- very rigid out layer (cell wall), have chloroplasts (for photosynthesis), the vacuole is one large pocket in plant cells (many small ones in animal cells).

9. Should certain forms of stem cells (i.e. embryonic) be banned, while others (i.e. umbilical) become/remain funded? Give two points supporting your point of view.

your own opinion

Unit 2 – Chemistry

1. Which one of the following elements has 5 valence electrons?

- a) boron
- b) lithium
- c) hydrogen
- d) iodine
- e) **nitrogen**

2. When a chemical reaction takes place, the total mass of the products is always what?

- a) Greater than the total mass of the reactants
- b) Less than the total mass of the reactant
- c) **Equal to the total mass of the reactant**
- d) Dependent on the type of reaction
- e) Impossible to determine

3. What is another name for a negative ion?

- a) valence electron
- b) ionic compound
- c) **anion**
- d) cation
- e) stable octet

4. What is the correct chemical formula for Calcium Nitride?

- a) CaN
- b) Ca₂N
- c) Ca₂N₃
- d) **Ca₃N₂**
- e) Ca(NO₃)₂

5. Which of the following metals does NOT have more than one possible ion charge?

- a) Mn
- b) Fe
- c) **Zn**
- d) Cu
- e) Sn

6. Which best describes the pH of acids?

- a) Higher than 0
- b) Lower than 0
- c) Approximately 0
- d) Lower than 7**
- e) Higher than 7

7. Which of the following combinations would give a neutralization reaction?

- a) $\text{LiOH} + \text{Ca}(\text{NO})_2$
- b) $\text{H}_3\text{PO}_4 + \text{CH}_4$
- c) $\text{SnCl}_6 + \text{BeF}_2$
- d) $\text{Cu} + \text{AlF}_3$
- e) $\text{HCl} + \text{Ca}(\text{OH})_2$**

8. Which of the following contributes to making acid rain?

- a) N_2
- b) NH_3
- c) HBr
- d) SO_3** (mixes with water to form sulfuric acid)
- e) $\text{Ca}(\text{OH})_2$

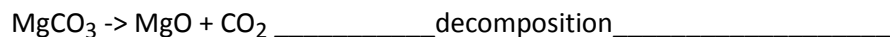
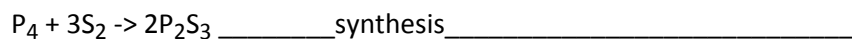
9. Write the name for each of the following compounds.

- a) $\text{Mg}(\text{ClO})_2$ (ionic) magnesium hypochlorite
- b) CuF_2 (ionic) copper (II) fluoride
- c) Sb_2F_3 (Covalent/Molecular) diantimony trifluoride
- d) Li_2SO_4 (ionic) lithium sulfate

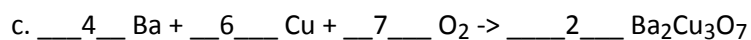
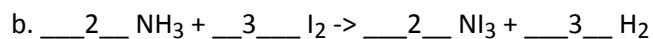
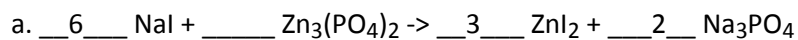
10. Write the chemical formula (balanced) for each compound.

- a) Cesium Chloride (ionic) _____ CsF _____
- b) Sodium Carbonate (ionic) _____ Na_2CO_3 _____
- c) Manganese (IV) Sulfate (ionic) _____ $\text{Mn}(\text{SO}_4)_2$ _____
- d) Dihydrogen Disulfide (covalent/molecular) _____ H_2S_2 _____

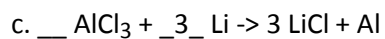
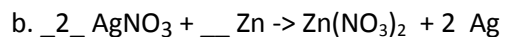
10. Label each chemical reaction as synthesis, decomposition, combustion, single displacement, or double displacement:



13. Balance each of the following chemical reactions:



14. Predict the products, write the proper chemical formula for each product, and balance the equation for the following.



Unit 3 – Climate Change

1. Which of the following is not expected to happen as global temperatures increases?

- a) Increased frequency of severe weather
- b) Sea levels rise
- c) Change in solar constant**
- d) Increased carbon dioxide concentrations
- e) Polar ice melts

2. Decreases in precipitation can lead to what?

- a) Desertification**
- b) Deforestation
- c) Orographic effect
- d) Thermohaline circulation
- e) None of the above

3. The 23.5° tilt of the Earth's axis contributes to creating what?

- a) Increased cloud cover
- b) Night and day
- c) The various seasons
- d) Constant temperatures around globe
- e) None of the above**

4. The layer of gases that surrounds a planet or moon is known as the what?

- a) Biosphere
- b) Lithosphere
- c) Hydrosphere
- d) Gaseousphere
- e) Atmosphere**

5. Match the following definitions to the corresponding words.

- | | |
|---------------------|---|
| _C__ Conduction | A) Heat transfer without touching |
| _F__ Convection | B) A current of fast-moving air in the upper troposphere |
| _A__ Radiation | C) Heat transfer by touching |
| _H__ Greenhouse Gas | D) A region that shares plants, animals and climate characteristics |
| _D__ Biome | E) Caused by human activity |
| _E__ Anthropogenic | F) Heat transfer by motion in gases and liquids |
| _G__ Climatograph | G) A representation of precipitation and temperature data |
| _B__ Jet Stream | H) Molecules in the atmosphere that trap heat |

6.

a) What is the greenhouse effect? You may use a diagram if you wish.

see pg 273

b) What is the difference between the natural and anthropogenic greenhouse effects?

anthropogenic means humans cause it, natural would occur if humans were here or not

7. What is the albedo effect? Explain how Earth's albedo is expected to change as the Earth warms.

the material that the light hits on the ground dictate how much of the light get absorbed and how hot the surrounding area gets. More detail on pg 275

8. Explain how a volcanic eruption in the Philippines can affect temperatures across the entire planet.

like a ripple effect, more heat in the Philippines would change the precipitation in that area and a chain reaction slowly changes temperature around the world. Also the ash from the volcano can float through the sky and block sunlight from hitting the surface in other parts of the world, cooling those areas. Many answers are valid for this question.

Unit 4 – Optics (Knowledge: 19 marks; Inquiry (Thinking): 4 marks; Communication: 0 marks;

Application: 12 marks)

1. A transparent substance has an index of refraction of 2.1. How fast does light pass through this substance?

- a) **$1.4 \times 10^8 \text{ m/s}$**
- b) $2.1 \times 10^8 \text{ m/s}$
- c) $3.0 \times 10^7 \text{ m/s}$
- d) $6.3 \times 10^8 \text{ m/s}$

2. The focal length of a convex mirror is:

- a) 0
- b) the distance to the centre of curvature, C
- c) positive
- d) **negative**

3. What is a concave mirror?

- a) It is a mirror that has a reflecting surface that curves outward.
- b) It is a mirror with a flat reflecting surface.
- c) **It is a mirror that has a reflecting surface that curves inward.**
- d) It is a type of mirror that creates an image identical to the object in terms of orientation, size, and location.

4. The phosphor coating inside a fluorescent light bulb absorbs what kind of radiation before emitting it as visible light?

- a) Microwave
- b) Infrared
- c) **Visible**
- d) Ultraviolet
- e) X-Ray

5. A convex mirror that has a centre of curvature at 24 cm has a focal length of how long?

- a) 24 cm
- b) 12 cm
- c) -24 cm
- d) **-12 cm**

6. When the image is behind a concave mirror, what is the value of the image distance in the mirror equation?

- a) The image distance, d_i , is positive.
- b) The image distance, d_i , is negative.**
- c) The image distance, d_i , is exactly zero.
- d) An image cannot appear behind a concave mirror.

7. What is a spherical aberration?

- a) It is an image that is formed when reflected rays meet.
- b) It is a change in the size of an optically produced image.
- c) It is a type of irregularity in an image seen in a curved mirror.**
- d) It is a type of mirror that has a reflecting surface that curves inward.

8. When do spherical aberrations occur?

- a) They occur when reflected rays from the inner parts of the mirror do not go through the focal point.
- b) They occur when reflected rays from the outer parts of the mirror do not go through the focal point.**
- c) They occur when reflected rays from the inner parts of the mirror go through the focal point.
- d) They occur when reflected rays from the outer parts of the mirror go through the focal point.

9. What does a negative value of h_i represent?

- a) inverted image**
- b) upright image
- c) real image
- d) virtual image

10. What does a negative value of d_i represent?

- a) inverted image
- b) upright image
- c) real image
- d) virtual image**

11. What does a negative focal length represent?

- a) convex mirror**
- b) concave mirror
- c) negative index of refraction
- d) index of refraction greater than 1

12. Match the following definitions to the corresponding words.

__A__ Dispersion

A) The process of separating colours by refraction

__B__ Excited

B) This describes the state of atoms just after absorbing energy

__C__ Inverted

C) This word describes an image that is upside-down

__D__ Incandescence

D) Light emitted from a high-temperature material

__E__ Fluorescence

E) Light that is emitted during exposure to UV radiation

__F__ Bioluminescence

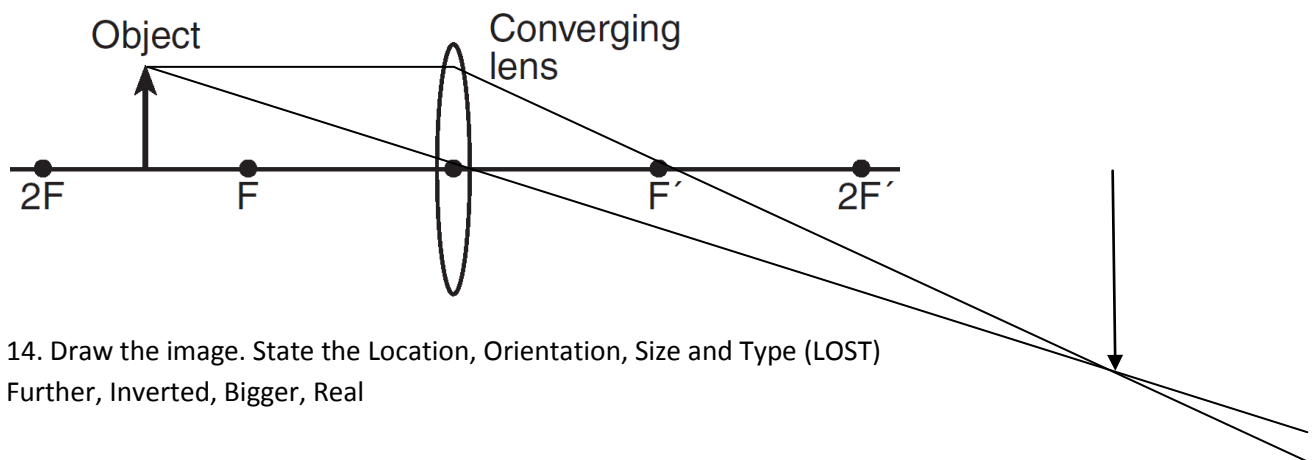
F) Light produced by a chemical reaction in a living organism

__G__ White

G) Light that is made up of many different colours mixed together

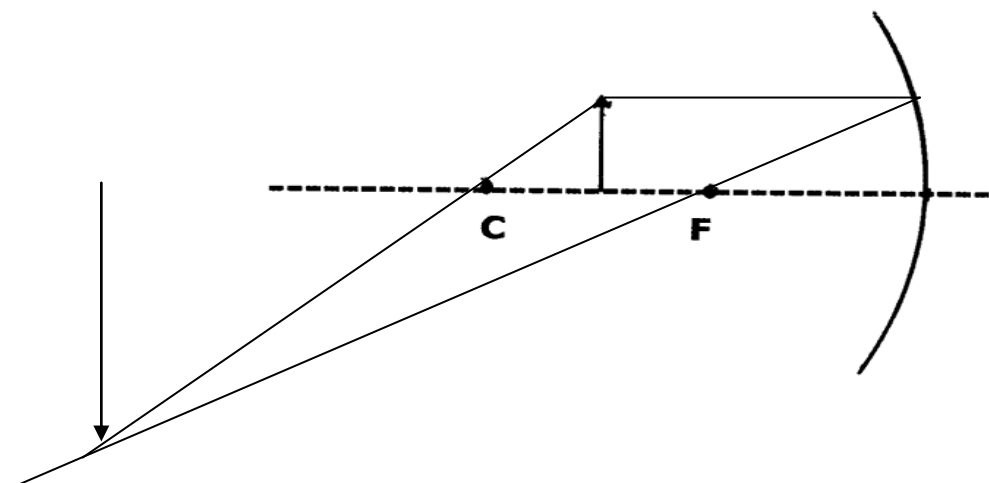
13. Draw the image. State the Location, Orientation, Size and Type (LOST)

Further, Inverted, Bigger, Real



14. Draw the image. State the Location, Orientation, Size and Type (LOST)

Further, Inverted, Bigger, Real



15. A 25cm high object is placed 20 cm from a concave mirror with a focal length of 15 cm. Where will the image be located? What is the height of the image? State the four characteristics of the image (LOST).

$$d_i = 60$$

$$h_i = -75$$

Further, inverted, bigger, real

16. A 9cm high object is placed 3 cm from a concave mirror with a focal length of 6 cm. Where will the image be located? What is the height of the image? State the four characteristics of the image (LOST).

$$d_i = -6$$

$$h_i = 18$$

Further, upright, bigger, virtual